

## ***Time Critical Diagnosis-Stroke and STEMI System Implementation***

***Meeting Three, December 2, 2008***

### ***Meeting Highlights***

#### **ATTENDEES:**

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Dr. Samar Muzaffar, Department of Health and Senior Services ( DHSS); Paula Adkison, DHSS; Jennifer Aiken, Centerpoint Medical Center; Mark Alexander, CoxHealth; Dr. Lynthia Andrews, Heartland Regional Medical Center; Dr. Clara Applegate, Ozark Medical Center; Lisa Archer, Northeast Regional Medical Center; Dr. Richard Bach, Washington University School of Medicine; Dr. Dmitri Baklanov, University of Missouri Hospital and Clinic; Dave Barringhaus, Physio-Control; Steve Bassett, Ozarks Medical Center; Jack Bates, Air Evac Lifeteam; Carol Beal, St. John's Regional Health Center; Anita Berwanger, DHSS; Nancy Bettasso, St. John's Regional Medical Center; Dr. Matthew Brandt, Cox Medical Center; Linda Brown, Southeast Missouri Hospital; Jo-Ann Burns, Barnes-Jewish Hospital; Donna Cash, North Kansas City Hospital; Doug Clark, Herman Area EMS; Lorie Cobb, Northwest Medical Center; Karen Connell, DHSS; Katie Connolly, American Heart Association; Donna Lee Cox, St. Louis Fire Department; Patti Crimmins-Reda, Barnes-Jewish Hospital; Dr. Salvador Cruz-Flores, St. Louis University Hospital; Mike D'Agostino, Metropolitan Ambulance Service Trust; Rich Dandridge, Warren County Ambulance District; Susan Davis, St. John's Mercy Medical Center; Liz Deken, American Heart Association; Dr. Michael Ditmore, Missouri Center for Patient Safety; Joan Drake, Staff for Life Helicopter Service; Mary Jo Draper, The Vandiver Group; Valerie Dutcher, Heartland Regional Medical Center; Joan Eberhardt, DHSS; Katie Egan, Barnes-Jewish Hospital; Angelia Elgin, Northeast Ambulance and Fire Protection District; Rhonda Evans, Community Hospital Association; Dr. Michael Farrar, North Kansas City Hospital; Jason Fenton, ZOLL; Kelly Ferrara, The Vandiver Group; Linda Freymuth, Lincoln County Ambulance District; Shirley Gastler, DHSS; Bryant Gladney, Martha Gragg, Missouri Foundation for Health; Michael Graves, North Kansas City Hospital; Dale Green, PRN Healthcare Consultants; Andy Gucciardo, St. Louis University Hospital; Paul Guptill, Missouri Hospital Association; MayeBeth Hadfield, Genentech; Robin Hamann, American Heart Association; Dr. Kathryn Hedges, Lee's Summit Medical Center; Kathleen Henderson, St. Joseph Medical Center; Michael Hicks, Mid-American Regional Council; Linda Hill, St. Anthony's Medical Center; Sean Hill, Linn County Ambulance District; Tracy Howard, Centerpoint Medical Center; Lindy Huff, St. Luke's Hospital; Elizabeth Hunter, St. John's Hospital; Lisa Hutchison, St. John's Regional Health Center; Judy James, American Heart Association; Stacey Jett, Boone Hospital; Freida Juliano, Hannibal Regional Hospital; Melissa Kaufman, Audrain Medical Center; Mike Kendrick, Des Peres Hospital; Daniel Kernebeck, St. Louis University Hospital, Shelleen King, St. Luke's Brain and Stroke Institute; Jerry Kirchhoff, Air Evac Lifeteam; Dr. George Kichura, St. John's Mercy Heart and Vascular; Mary Ann Kirkpatrick, St. John's Hospital; Jill Kliethermes, Missouri Nurses Association; Mary Kleffner, DHSS; Dr. Michael Klevens, St. Luke's Hospital; Brenda Knight, Putnam County Memorial Hospital; Ken Koch, St. Charles County Ambulance District; Carol Lacy, Salem Memorial Hospital; Michael Lambert, University of Missouri Health Care; Michelle Leassner, Des Peres Hospital; Theresa Lee, Community Hospital Assn; Bonnie Linhardt, American Heart Association; Dean Linneman, DHSS; Jason Lynch, St. John's Mercy Medical Center; Randy McCullough, Lafayette Regional Health Center; Bryant McNally, Missouri Hospital Association; Deborah Markenson, DHSS; Dr. Steve Marso, Cardiovascular Consultants; Chris Medlin, Capital Region Medical Center; Bill Meeker, Laredo Fire Department; Ruby Mehrer, Lifeflight Eagle; Darla Merideth, St. Joseph Hospital West; Taz Meyer, St. Charles County Ambulance District; George Miller, Boone County Fire Protection District; Michelle Miller, Missouri Foundation for Health; Eric Mills, University Hospital Ambulance Service; Sharon Monical, Missouri Baptist Medical Center; Nancy Nahlik, Missouri Baptist Medical Center; Carol Nierling, University of Missouri Hospital and Clinic; Tony Nunn, St. Luke's Hospital of Kansas City; Peggy Parks, Northeast Regional Medical Center; Cynthia Peters, St. Mary's Medical Center; Joe Piskulic, Jefferson Memorial Hospital; Debbie Playter, Audrain Medical Center; Dr. Raana Ponstingl, Des Peres Hospital; Sharon Pulver, St. Joseph Health Center; Pam Ragan, Cedar County Memorial Hospital; Dr. Danelle Richards, St. John's Hospital- Lebanon; Lisa Riggs, St. Luke's Health System; Dr. Terrence Riley, Lee's Summit Medical Center; Connie Roberts, Putnam County Memorial Hospital; Dr. John Russell, Cape County Private Ambulance Service; Dr. Joseph Salomone, Kansas City EMS Medical Director; Twany Sandifer, Capital Region Medical Center; Chris Schulze, CoxHealth; Barb Seagrass, Des Peres Hospital; Heather Seemann, SSM St. Joseph Hospital of Kirkwood; Dr. Niranjn Singh, University of Missouri School of Medicine; Sondra Solomon, Barnes-Jewish Hospital; Edward Spain, St. John's Regional

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Health Center; Mary Spencer, Barnes-Jewish Hospital; Debby Sprandel, St. Francis Medical Center; David Stagner, St. Francis Medical Center; Chad Staley, Montgomery County Ambulance District; Dr. David Tan, Barnes-Jewish Hospital; Kelly Thomas, St. John's Regional Medical Center, Dr. Alan Umbright, SSM St. Joseph, St. Charles; Laura Wallace, Centerpoint Medical Center; Michael Wallace, Central Jackson Fire Protection District; Jim Waring, Wheeler Heart and Vascular Center, Terri Waters, The Vandiver Group; Marilyn Welling, St. John's Regional Medical Center; Jason White, Metropolitan Ambulance Service Trust; Dick Wiles, Genentech; Jeff Wilson, North Kansas City Hospital; Amy Wood, American Heart Association; Steve Woods, Des Peres Hospital; Darrell Wright, Chillicothe Emergency Services; Monroe Yancie, St. Louis Fire Department; and Beverly Smith, DHSS.

### **General Information**

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A total of 140 people attended the third meeting of the Time Critical Diagnosis (TCD) Stroke and STEMI system implementation process. Dr. Muzaffar recognized the Missouri Foundation for Health for their ongoing support to advance the TCD system. Advisory Committee members were introduced. They advise the Department on processes and approaches for the work group efforts to improve the Emergency Medical Service (EMS) system to support stroke and STEMI care.

A copy of HB 1790 was included in the handouts so participants had a reference for the statute that provides authority to the Department to promulgate regulations to create stroke and STEMI center designations. The statute states that "peer-reviewed and evidence-based clinical research and guidelines" must be used to support the recommendations. Work groups were asked to assist the Department compile this information for any required criteria they recommend be included in the regulations.

Kelly Ferrara reviewed the steps to access the "work zone" on the 360/365 website for work group participants. If problems occur, work group participants should contact Cassie McCloud ([cmccloud@vandivergroup.com](mailto:cmccloud@vandivergroup.com) 314-991-4641 ext. 114 or Kelly Ferrara ([kferrara@vandivergroup.com](mailto:kferrara@vandivergroup.com))). Participants should note the source for any document posted and someone from the Vandiver Group will note the date posted

### **STEMI Group—Dr. George Kichura, Lead**

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Key Accomplishment: The criteria from the four work groups were compiled into one document that the full group reviewed and discussed. There was productive discussion on the framework (attachment 1) and modifications were made.

#### Areas where need additional resources or information:

- Number of levels for center designations. Pros and cons for creating multiple levels of centers will be tracked through the work group discussion and reviewed at later date to inform the final decision regarding the number of levels of center designation. Level IV facilities, currently being considered for the trauma

system, focus on stabilizing and transporting to a higher level of center care. The hospitals voluntarily choose whether they want to become designated as a STEMI center. Support expressed for making the system as inclusive as possible for all hospitals.

- Percutaneous Coronary Interventions (PCI) for STEMI-designated centers was discussed extensively.
  - Volume: National data indicates that facilities that perform 75-80 PCI's annually for STEMI patients are proficient in the procedure. Total volume of PCIs conducted annually was also discussed and the group recommended that Level I facilities perform at least 400 and Level II and III facilities perform at least 200 PCIs per year.
  - There is limited data regarding the time span from the time when symptoms are first noted, the 911 call is received, or the patient arrives at hospital (either walk-in or via emergency medical services (EMS) to the time when the PCI is done. Establishing a means to track this time and improve timeliness of care is important.
  - Hours of PCI availability were also discussed. Concern was expressed that it could be confusing for EMS to factor in hours of a facility's PCI service availability to determine where to transport.
  - Other variables to consider regarding PCI volume requirements.
    - May be occasions when patient is better served by transporting to Level II or III facility that can conduct PCI in reasonably timely manner compared to risks imparted due to time delay to transport to Level I facility with 24/7 PCI capacity.
    - Group wants data on current PCI capacity of hospitals.
    - During this discussion stage, decision must be backed by evidence and not on what would allow more facilities to serve as STEMI designated centers.
- Performance Metrics will need to be defined in more detail and will evolve as system evolves. Published information is available on measure for STEMI care that relates to times from door of hospital to "balloon time". Measures for system approach will need to address transport and care issues from the time of 911 calls, transfer from another hospital or walk-in to time facility provides definitive treatment.
- Diversion policies were discussed with general agreement that there should be process in place for centers to accept all STEMI patients with only rare exceptions. Performance metric could be established for this variable.
- Research requirements for Level I centers were discussed extensively. It was generally agreed that requirement should not be too stringent and language was drafted for further review (see attachment 1).
- Discharge of patient back to community primary care physician and rehabilitative care, if needed, was discussed. It was noted that there are current hospital procedures that address this transition. Want to review the CMS requirements and other viable approaches to inform this recommendation.

- Preliminary discussion was held on personnel requirements for staffing centers. The sub-group provided extensive detail on these elements.

For Discussion at Next Meeting: Will continue discussion on criteria in framework.

- Framework will be reordered to be more logical and align with trauma and stroke criteria where appropriate. Comparison will also be done with relevant stroke and trauma criteria.

### **Stroke Group—Dr. Salvador Cruz-Flores and Eddie Spain, Leads**

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#### Key Accomplishments:

- Finalized criteria for four levels of designated stroke centers based on The Joint Commission, Brain Attack Coalition (BAC) and original working proposal of the Stroke and STEMI Task Force that met earlier this year. See attachment 2.
- There are few differences between the criteria for Level I and II centers. Level III is “drip and ship” and Level IV is stabilize and ship.
- Regulatory subcommittee has been formed and will work with Regulation work group to advise Department on regulatory language.

#### Areas where need additional resources or references:

- Assure that language is appropriate for regulations—work with regulation group and department staff.
- Determine appropriate level of proficiency needed by surgeons to perform Carotid Endarterectomy (CEA) in facilities designated as stroke centers.

#### For Discussion at Next Meeting:

- Complete review of select criteria for which additional information is made available.
- Review process for promulgating regulations.
- Begin work on professional education issues.

### **Out-Hospital Group—Ken Koch, Lead**

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#### Key Accomplishments:

- The protocol for dispatch for all time critical diagnosis patients was reviewed and modified. (attachment 3)
  - The group recommends that emergency medical dispatch functions be preformed by certified personnel that use an Emergency Medical Dispatch Reference System (EMDPRS).

- The group further recommended that the EMDPRS protocols used by dispatch personnel be approved by the medical director that oversees the EMS service to assure compliance with national standards.
- Need to establish means within Missouri system to make sure dispatch and EMS-ambulance service medical directors have agreement regarding how the ambulance is dispatched to the scene of the emergency. Concerns regarding whether the current Missouri statutes support appropriate dispatch for time critical patients.
- System should provide options for dispatch training.
- The stroke protocol for treatment guidelines for patients exhibiting stroke symptoms was reviewed and modified. (attachment 4)
  - The out-of-hospital group reviewed stroke scale options. Want state standard that is universally used. General agreement on the use of the Cincinnati Prehospital Stroke Scale for further discussion with the Stroke-Hospital Work Group.

Areas where need additional resources or references:

- Want to post protocols on work zone for members to review prior to the next meeting.

For Discussion at Next Meeting:

- Finish protocol review with focus on STEMI.
- Begin discussion on pre-hospital professional education issues.

**Joint Out-of-Hospital and Stroke Work Group Discussion**

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- General agreement between two groups on dispatch protocol.
- Much discussion on the importance of short transport times. Area of concern is intra-facility transports that may result when patient walks-in or is initially transported to facility not equipped to treat stroke and there is a two to three hour time delay until patient arrives at facility that can provide definitive care for stroke. The system must support transport to designated center and avoid this type of delay.

**Attachment 1**  
**Hospital-STEMI Work Group**  
**Criteria for STEMI Center Designation**  
**Discussed December 2, 2008**

Will revise this framework to eliminate redundancies between the sub-work groups and order criteria in manner that is similar with trauma and stroke care.

CRITERIA	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
<b>Group A/B</b>				
<b>I. Volume: (Revisit volumes—rural areas time vs. treatment delays)</b>				
1. Elective PCI/year	400	200	200	
2. 75+ PCI procedures for STEMI/year	x	x		
<b>II. Hospital Capabilities:</b>				
1. Cardiac rehab available onsite/within network (see IX) (Move to later in document—IX, much debate but not clear decision on this criteria)	x	x		
2. Designated ICU for STEMI patients	x	x	x	
3. 24/7 Clinical Laboratory to provide necessary testing and results	x	x	x	
4. One call access to cath lab team via ED (See VIII) (includes level III & IV transfer hospital to make call and activate)	x	x	x	x
5. Formal alliance with Level I/Level II STEMI Center to transfer complex patients	x	x	x	X
6. Protocols for triage, transfer, and/or treatment of STEMI patients in ED (See VIII)	x	x	x	X
7. STEMI Medical Director	x	x	x	X
8. STEMI Program Manager	x	x	x	X
9. 24/7 Surgical Backup	x			
10. Angiography and interventional capabilities available on 24/7 basis (want to revisit if go to IV level)	x	x		
11. Time Frame for availability of services (Group C/D/E.)				
i. 24/7 Emergency Department with physician access (either 24/7 or accessible within 20 min. -need to consider those hospitals in rural areas)	x	x	x	x
ii. 24/7 CATH Lab and Coronary Artery Bypass Graft (CABG)	x			
iii. Intermittent cath lab (revisit is go to 4 levels)			x	
<b>III. Performance Metrics:</b>				
1. PCI within 90 minutes of arrival (x% of time) (need data set to evaluate appropriate x% of time; may need to consider timeframe for this criteria; time is based on first medical contact time) Challenge in view of current data based on D2B time. Must give clear recommendation for EMS for when need to transfer to Level I vs. take to other	x	x		

Attachment 1, STEMI Criteria, Stroke and STEMI System Meeting Highlights  
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hospital					
CRITERIA		LEVEL I	LEVEL II	LEVEL III	LEVEL IV
2.	Patient presentation—do different metrics based on whether patient is walk-in, transfer, versus EMS transport				
	PCI within 90 min of arrival when available (x% of time)			x	
3.	Lytics within 30 minutes of arrival (x% of time)—need to revisit when finalize number of designation levels		x	x	
4.	Formal STEMI/AMI CQI process	x	x	x	
<b>IV. Personnel Education/Credentials: (Combine with Group I)</b>					
1.	RN credentialing for STEMI care	x	x	x	
2.	Medical Director CEU hours	x	x	x	
3.	Emergency Department RN CEUs	x	x	x	
4.	Minimum CEU requirements for ED and Cath Lab staff	x	x	x	
<b>V. Community Education:</b>					
1.	Public education program for STEMI signs/symptoms, emergency transport, STEMI treatment	x	x	x	x
2.	Ability to collect and report data to STEMI registry/STEMI reporting to DHSS	x	x	X	x
3.	Cardiology outreach program for 24 hour phone consults consider level II if have four levels for center designation.	x	X?		
<b>VI. Research: (See Group F/G/H-XI)</b>					
	Active research program focusing on STEMI	x			
<b>Group C/D/E</b>					
<b>VII. Diversion Avoidance Policy</b>					
1.	Process in place for acceptance of all STEMI patients (must have designated bed(s) for STEMI; may need to consider rare exceptions, e.g. time of disaster, need to be part of metrics; need backup plans for those centers with agreements; coordinate with existing rules and regs that deal with diversion policy; also must consider distinction between ED and cardiac cath as cath lab may be able to accommodate)	x			
2.	Diversion process in place for acceptance of all STEMI patients unless cath lab not available		x		
3.	Process in place for acceptance of all STEMI patients as determined by physician and EMS communication for reperfusion strategy.			x	

CRITERIA		LEVEL I	LEVEL II	LEVEL III	LEVEL IV
<b>VIII. Hospital protocol for pre-hospital and STEMI Team Communication</b>					
1.	EKG, system for communication between hospital and EMS staff 24/7, EM system	x	x	x	
2.	Mechanism in place for activation of Cardiac Cath lab team at time of EMS STEMI identification	x	x	x	
<b>IX. Hospital protocol for care and coordination</b>					
1.	Staff credentialed in STEMI (see credential section XIV.)	x	x	X	x
2.	Cardiac rehabilitation in-house—Phase I (required for III if 4 levels)	x	x	x	
3.	Arrangement/ discharge plan for the provision of cardiac rehabilitation post discharge—part of d/c documentation	x	x	x	x
<b>X. Hospital protocol for rapid transfer from non-PCI facility (when appropriate)</b>					
1.	Accept all STEMI transfers (coordinate with prior diversion language VII.1.)	x			
2.	Accepts all transfer when cath lab available. When cath lab not available, rapid transfer process in place to higher level.		x	x	
3.	A rapid transfer process in place with higher level of STEMI care			x	☐
<b>Group F/G/H</b>					
<b>XI. Institutional involvement in clinical research related to heart disease or STEMI</b>					
1.	Institution will conduct or participate in research study that is under auspices of IRB oversight either at that facility or cooperative facility. (Structure this criteria so it is in parallel to stroke/STEMI) <b>PROPOSED WORDING</b>				
2.	Patient oriented research required, in one of the following: <b>BELIEVED THIS CRITERIA TO BE TOO DETAILED AT THIS TIME (12/2/08)</b>	X			
	i. Mechanism of human disease	X			
	ii. Therapeutic interventions	X			
	iii. Clinical trials				
	iv. Development of new technologies				
3.	Epidemiologic and behavioral studies	X			
4.	Outcomes research and health services research	X			
5.	An established Institutional Review Board (IRB) is required	X			
6.	Access to an IRB		X		



CRITERIA	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
<p>7. The hospital and its staff shall support a research program in STEMI as evidenced by any of</p> <ul style="list-style-type: none"> <li>• Publications in a peer review journal</li> <li>• Reports of findings presented at regional and/or national conferences</li> <li>• Receipt of grants for study of STEMI care</li> <li>• Production of evidenced based reviews</li> </ul> <p><b>ALTERNATIVE WORDING FOR RESEARCH</b></p>	X			
8. Cooperate and participate with the DHSS in conducting epidemiological studies and individual case studies for the purpose of developing STEMI prevention programs	X	X	X	
<b>XII. Hospital capacity to support STEMI patient care and discharge transition back to care and oversight by their primary care physician.</b>				
1. Reperfusion therapy availability (number of procedures, 24/7 availability, rural vs. urban)				
2. Availability of hospital departments/services to support STEMI care				
ED				
Cath Lab				
ICU				
Inpatient areas				
General standards for staffing and competencies				
Competencies for each of these areas				
3. Clinical competency of staff				
4. Transfer capability for sending and receiving facilities				
<p>5. Discharge transition back to care and oversight by Primary Care Physician (PCP) (coordinate with existing procedures; many patients do not have primary care physician— look at CMS requirements and other alternatives to address, suggested might consider LPHAs to serve assurance role where patient does not have PCP)</p> <ul style="list-style-type: none"> <li>• Secondary prevention</li> <li>• Discharge planning</li> </ul>				
6. Timely feedback for sending and receiving facilities				
Call within 24 hours followed with written notice within 72 hours (this is reference to EMS providers)				
7. Quarterly regional STEMI conferences				
8. Public education and awareness activities				

CRITERIA		LEVEL I	LEVEL II	LEVEL III	LEVEL IV
<b>XIII.</b>	<b>Ability to report data and maintain quality improvement process</b>				
	1. Immediate (define) feedback to the transfer hospital and EMS				
	2. Competencies for the practitioner, nurse and physician				
	3. ACC guidelines/registry				
	4. ACC/PCI guidelines				
	5. Reimbursement issues <ul style="list-style-type: none"> <li>• Should it be tied to a registry?</li> <li>• Severity of illness?</li> </ul>				
	6. Quality vs. what for EMS to decide which place to go				
	7. Risk adjusted mortality				

#### XI V. Personnel Credentials and Abilities (Group I.)

Department /Position	Credentials and Abilities	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
<b>A) Emergency Department</b>					
<b>Physicians 1) Medical Director</b>					
	a) BCEM Recommended	X	X	R	R
	b) BCEM required by 2020	X	x		
	c) Five hours CME every three years or participation in one hospital-sponsored grand rounds every two years on management of ACS/STEMI*				
	d) ACLS				
	e) Demonstrate ECG interpretation competency under the purview of the hospital PI committee (options to demonstrate proficiency is very costly, may want focus on front-line clinicians, need to clarify if this is for individual vs. competency within the unit, believe this may be too detailed for regulation, ability to assess while challenging, is critical, look at trends and patterns through in-hospital)				
	f) Must be a member of the STEMI/ACS oversight committee				
<b>2) Emergency Physician</b>					
	a) BCEM Recommended	X	x		
	b) New hire physicians: BCEM required by 2020 (debate and discussion regarding the time frame, general agreement for reaching for higher standard, this standard could not be reached by the lower level physicians, issue of concern where is workforce to meet this requirement)	X	X		
	c) Five CME hours on the management of Acute Coronary Syndrome (ACS) and/or STEMI every three years or participation in one hospital-sponsored grand rounds every two years *	X	x		
	d) ACLS	X			
	e) Demonstrate ECG interpretation competency under the purview of the hospital PI committee				
<b>3) Other Physicians</b>					
	a) ACLS				
	b) Five hours CME every three years or participation in one hospital-sponsored grand rounds every two years on the management of ACS and STEMI*				

Department /Position	Credentials and Abilities	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
<b>Nurses</b>	4) Nursing Staff (check scope of practice to assure that allows Nurses/nurse practitioner to interpret ECG)				
	a) ACLS		R		
	b) <del>60% of staff CEN by 2020 -- strike</del>		<del>R</del>		
	c) Annual ACS course demonstrating ACS/STEMI competency to include the minimum:				
	d) Obtaining a 12-lead ECG				
	e) Obtaining a right-sided ECG				
	f) ECG ST-segment and T-wave interpretation				
	g) Signs and symptoms of ACS in patients				
	h) Signs and symptoms of ACS in patient with co-morbidities				
	i) Gender differences in the symptoms of ACS				
	j) Age-related differences in the symptoms of ACS				
	k) Identifying major dysrhythmias				
	5) <b>Allied Health Professionals—review scope of practice to allow level of practice needed</b>				
	Annual competencies including				
	a) Obtaining a 12-lead ECG				
	b) Obtaining in right-sided ECG				
<b>B) Cardiology</b>					
<b>Physicians</b>	1) <b>Medical Director-Cath Lab</b>		R		
	a) BCIM				
	b) BCCV		R		
	c) BCIC required by 2020		D		
	d) 5 hours CME every 3 years or participation in one hospital-sponsored grand rounds every two years on the management of ACS and STEMI*				
	e) ACLS				
	f) Must be member-STEMI/ACS oversight committee				
	2) <b>Interventional Cardiologist</b>				
	a) BCIM		R		
	b) BCCV		R		
	c) Recommended BCIC		R		
	d) BCIC		D		
	e) Five hours CME every three years or participation in one hospital-sponsored grand rounds every two years on the management of ACS and STEMI*				
	f) ACLS				

Department /Position	Credentials and Abilities	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
<b>Nurses</b>	<b>2) Nursing Staff</b>				
	a) ACLS				
	b) Technological Competencies including: (1) IABP (2) LVAD (3) Temporary Pacer				
	c) Annual ACS course demonstrating ACS/STEMI competency to include the minimum: (1) Obtaining a 12-lead ECG (2) Obtaining a right-sided ECG (3) ECG ST-segment and T-wave interpretation (4) Signs and symptoms of ACS in patients (5) Signs and symptoms of ACS in patient with co-morbidities (6) Gender differences in the symptoms of ACS (7) Age-related differences in the symptoms of ACS (8) Identifying major dysrhythmias				
	<b>d) Demonstrated competency of medical education and complication management</b>				
<b>Others</b>	<b>3) Cath Lab Technicians</b>				
	a) ACLS				
	b) Recommended RCVT, RCIS				
	c) RCVT, RCIS by 2020				
<b>C) Post-STEMI Cardiac After-care</b>					
<b>Physicians</b>	<b>1) Medical Director</b>				
	a) BCIM				
	b) BCCV				
	c) Five hours CME every three years or participation in one hospital-sponsored grand rounds every two years on the management of ACS and STEMI*				
	d) ACLS				
	e) Must be a member of the STEMI/ACS oversight committee				
	<b>2) Physicians</b>				
	a) BCIM				
	b) BCCV				
	c) Five hours CME every three years or participation in one hospital-sponsored grand rounds every two years on the management of ACS and STEMI*				
	d) ACLS				
<b>Nurses</b>	<b>3) Nursing Staff</b>				
	a) ACLS				
	b) Technological Competencies including: i) IABP ii) LVAD iii) Temporary Pacer				

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<p>c) Annual ACS course demonstrating ACS/STEMI competency to include the minimum:</p> <ul style="list-style-type: none"><li>i. Obtaining a 12-lead ECG</li><li>ii. Obtaining a right-sided ECG</li><li>iii. ECG ST-segment and T-wave interpretation</li><li>iv. Signs &amp; symptoms of ACS in patients</li><li>v. Signs and symptoms of ACS in patient with co-morbidities</li><li>vi. Gender differences-symptoms of ACS</li><li>vii. Age-related differences in the symptoms of ACS</li><li>viii. Identifying major dysrhythmias</li></ul>
<p>d) Demonstrated competency of medical education and complication management</p>
<p>e) CCRN: 60% recommended by 2012</p>

## Attachment 2-Stroke Center Designation Criteria

Discussed December 2, 2008

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### Level I Comprehensive Stroke Centers

#### EDITING NOTES:

Yellow highlighted text reflects new requirements for IV thrombolytic therapy – the work group asked for this info to be added.

Gray highlighted text reflects questions or uncertainty about whether to include.

- Requirements:
  - Meets the requirements specified in the Consensus Statement of Stroke on Comprehensive Stroke Centers. (Recommendations for comprehensive Stroke centers: a consensus statement from the Brain Attack Coalition. *Stroke*. 2005; 36(7):1597-616.
  - Meets the requirements specified for a Primary Stroke Center as specified by The Joint Commission.
  - Follows current Joint Commission Core Measures:
    - DVT prophylaxis
    - Discharged on antithrombotic therapy
    - Patients with A-Fibrillation receiving anticoagulation
    - Thrombolytic therapy administered
    - Antithrombotic therapy by end of hospital day 2
    - Discharged on cholesterol-reducing medication
    - Dysphagia screening
    - Stroke education
    - Smoking cessation education/advice/counseling
    - Assessed for rehabilitation
  - Follows the Brain Attack Coalition's benchmark treatment times:
    - Door to physician exam = 10 minutes
    - Door to Stroke Activation = 15 minutes
    - Door to CT Scan = 25 minutes
    - Door to CT Report = 45 minutes
    - Door to tPA = 60 minutes
  - Ability and willingness to have drip and ship protocol for complex cases
  - Hospital and administrative support
  - Transfer agreements in place to serve as Hub to care for complex cerebrovascular cases for lower level hospitals in the region
  - The institution has and maintains a stroke registry
- Medical Director—include 3 or more of the following:
  - Board certified neurologist or vascular neurosurgeon with a stroke fellowship, or neurocritical care fellowship, or vascular neurosurgery fellowship or equivalent experience
  - Board certified in vascular neurology or neurocritical care
  - Fellow of the Stroke Council of the AHA
  - Clinician who diagnoses and treats at least 50 patients with cerebrovascular disease annually or more than 50% of his/her time is dedicated to the care of cerebrovascular patients and/or research on cerebrovascular disease
  - Clinician with at least 10 peer-reviewed publications dealing with cerebrovascular disease
  - Clinician with at least 12 CME credits each year in areas directly related to cerebrovascular disease

- Neurologists and Neurosurgeons
  - Neurosurgical expertise shall be available 24/7, and response time is within 5 minutes
    - There shall be personnel in-house (or be at the hospital within 20 minutes) who are capable of performing emergent neurosurgical procedures
    - Shall have expertise and experience in microsurgery for aneurysm clipping and surgical excision of AVM's
    - Written neurosurgical call schedules shall be available
    - The institution shall care for at least 30 SAH patients per year and shall accomplish at least 10 craniotomies per year for aneurysm clipping and at least 10 endovascular coilings of aneurysms.
    - Each Neurosurgeon shall participate in at least 10 cases per year
    - Perioperative mortality rate for aneurysm clipping shall be documented, reviewed and compared with published outcomes.
    - For AVM, treatment shall be available including microsurgical excision, endovascular embolization and stereotactic radiosurgery
    - 8 CME credits in area directly related to cardiovascular disease
- Acute Stroke Teams
  - Physicians with experience in diagnosing and treating cerebrovascular disease
  - Hospital based stroke team shall be available within 15 minutes by phone and at the bedside within the time period as designated by the stroke center director 24/7.
  - Response time may also be accomplished through telemedicine.
  - Evidence of stroke team log
    - Response times
    - Patient diagnosis
    - Treatments and actions
    - Outcomes
  - Documentation indicates that on a 24/7 basis, 80 percent of acute stroke patients have a diagnostic brain image completed within 45 minutes of it being ordered
  - Monitoring systems
    - Heart rate / rhythm with automatic arrhythmia detection
    - Blood pressure with noninvasive BP monitoring
    - Oximetry
- Written Care Protocols
  - Written protocols/care paths for the acute workup and treatment are available in the
    - ED department
    - Acute care areas
    - Stroke units
  - Protocols include management of:
    - Ischemic stroke
    - Hemorrhagic stroke
    - Initial diagnostic tests
    - Blood pressure management
    - Glucose control
    - DVT prophylaxis
    - Use of medications
    - tPA treatment
    - Early mobilization and physical medicine and rehabilitation evaluation



- **IV Thrombolytic therapy**
  - The organization's formulary or medication list shall include a thrombolytic therapy (IV administered) medication for ischemic stroke
  - Documentation indicates the reason eligible ischemic stroke patients did not receive an IV thrombolytic therapy
  - Emergency department licensed independent practitioners have 24 hour access to a timely, informed consultation about the use of IV thrombolytic therapy, obtained from a physician, privileged in the diagnosis and treatment of ischemic stroke.
  - Use of the protocol, including IV thrombolytic therapy when indicated by the treating licensed independent practitioner, is reflected in the order sets or pathways, and is documented in the patient's medical record according to organizational procedure.
  - There is evidence that specific stroke performance measurement data, focused on use of IV thrombolytic therapy, as evaluated through the quality improvement process and by the stroke team
- Telemedicine/telecommunication
  - Institution able to function as Hub for referral hospitals
  - Available 24/7
- Physicians who perform Carotid Endarterectomy
  - Surgeons with expertise in performing CEA's
  - Surgeons as a group shall perform a minimum number of 10 CEA's per year.
  - Results should be audited on a yearly basis, and the results of a rolling average of at least three years should be compared with published outcome and complication rates.
- Diagnostic Radiologists
  - Able to evaluate imaging studies 24/7
  - Available to read scans within 20 minutes of completion
  - Active full time staff
  - Available 24/7
  - Board certified/board eligible
- Neuroendovascular specialist(s)
  - Trained in neuroradiology, neurosurgery, vascular surgery, neurology, or cardiology
  - Completed neuroendovascular training that included minimum recommended standards for diagnostic angiography and neuroendovascular interventions as recommended by the major specialty societies and/or boards
  - Active full time staff
  - Available 24/7
  - Board certified/board eligible in the specialty
  - Results shall be audited on a yearly basis, and the results of a rolling average of at least three years shall be compared with published outcome and complication rates. Cases shall be peer reviewed as seen fit by the institution.
- ED (Emergency Department) personnel (physicians, nurses and EMS)
  - Written care protocols for acute stroke patients shall be available to EMS and ED personnel, and shall be reviewed and revised annually.
  - Annual review of EMS protocols with EMS medical director shall include

- Rapid, efficient patient assessment and triage
    - Prehospital EMS communication with hospital staff
    - Medical stabilization en route
    - Rapid communication between EMS and ED personnel during the transportation of acute stroke patients
  - ED protocols shall include
    - Well-defined and documented procedures for calling the acute stroke team
    - Goal door to needle time of 60 minutes or less for the administration of tPA to stroke patients
  - ED care providers are familiar with
    - Pathology, presentation, assessment, diagnostics, and treatment of patients with acute stroke
    - The location and application of stroke-related protocols, activation of the acute stroke team, and communications with inbound EMS
    - The recognition, assessment and management of acute stroke complications.
  - ~~○ 80 percent of the ED care providers must provide evidence of review of the acute stroke protocol~~
  - Eighty percent of ED practitioners are knowledgeable of the pathophysiology, presentation, assessment, diagnostics, and treatment of patients with acute stroke including:
    - Initial treatment plan: treatment of the patient during the first three hours of care, including thrombolytic therapy for patients who present within three hours of initial onset of symptoms.
    - indications for use of IV thrombolytic therapy
    - contraindications to IV thrombolytic therapy
    - education to be provided to patients and families regarding the risks and benefits of IV thrombolytic therapy
    - signs and symptoms of neurological deterioration post IV thrombolytic therapy
  - EMS and ED staff shall meet and review patient care issues with the CSC staff at least twice a year
  - At least two specific assessment criteria and benchmarks (quality assurance) related to acute stroke care shall be defined, measured and reviewed annually
  - ED personnel obtain eight hours of continuing education or equivalent educational program annually that focus on acute stroke care.
- NOTE: STROKE TASK FORCE RECOMMENDS A COMBINED TCD/EDUCATIONAL PROGRAM**
- Radiology Technologists
    - In-house CT technician 24/7
    - MRI technician available 24/7 – may take call from home as long as he/she can be at the hospital within One hour of being paged
    - Available to perform CT scans within 25 minutes of arrival for patients within 12 hours from symptom onset
    - Available and able to perform CT angiography, CT perfusion and MRI with stroke specific sequences including perfusion as requested by stroke team
  - Stroke Unit Nursing staff
    - Trained in the care of stroke patients
    - Trained in continuous cardiac and respiratory monitoring
  - Dedicated Neurosciences ICU Nursing
    - The ICU nursing director or manager shall have at least 10 hours per year of CEU training (or equivalent educational activities) related to cerebrovascular disease
    - The nurse: patient ratio in an ICU should be 1:1 or 1:2.
    - The ICU nursing staff shall be trained to assess neurologic function and deal with Neurocritical care:
      - Function of ventriculostomy and external ventricular drainage apparatus

- Function and maintenance of ICP monitors
  - Treatment of ICP
  - Care of patients with ischemic stroke, intracerebral hemorrhage and subarachnoid hemorrhage
  - Care of patients after reperfusion therapy
  - Management of blood pressure with parenteral vasoactive agents in patients with central nervous system disorders
  - Management of intubated / ventilated patients
  - Detailed neurologic assessments and scales
- The ICU nurses receive at least 10 hours per year of CEU credit (or other educational programs) in areas related to cerebrovascular disease including:
  - Cerebral edema
  - Aspiration pneumonia
  - Infection
  - Myocardial infarction
  - DVT
- Shall be familiar with standard neurologic assessments and scales, stroke protocols, care maps, ongoing research projects and new patients care techniques related to stroke.
- Attend training sessions sponsored by the CSC at least 3 times per year
- Participate in at least 10 hours of CEU activities (or other educational programs annually that are related to or focused on cerebrovascular disease
- Stroke Coordinator - Full time
  - Nurse practitioner or CNS
  - Or*
  - AANN certified registered nurse
  - Implement and coordinate the stroke program. Activities will include:
    - Monitor benchmarks
    - Patients and families education
    - Health care team education
- Physicians with expertise in critical care or neurointensive care
  - Board-eligible or board-certified neurologist, neurosurgeon, anesthesiologist, or internist who has completed either a critical care fellowship or Neurocritical care fellowship.
    - Care for at least 20 patients with acute strokes per year and attend at least four hours per year of CME activities (or similar educational programs related to or focused on cerebrovascular disease
    - Alternatively for those with critical care fellowship at least 25% of their patient population shall be stroke or critically ill neurological patients
- Physicians with expertise in echocardiography, carotid US, and Transcranial Doppler
  - Technicians may take call from home as long as he/she can be at the hospital within one hour of being paged
- Physical Medicine & Rehab physician(s) Rehabilitation services

- Directed by a physician with board certification in physical medicine and rehabilitation or by other properly trained individuals (i.e., neurologist experienced in stroke rehabilitation)
- Rehabilitation Therapists
  - Consults for physical medicine and rehabilitation, PT, OT, and SLP shall be requested and assessment completed within 24 hours of admission if medically indicated
  - All therapists shall meet requirements for state licensure
    - At least one year experience in the treatment of stroke survivors
    - Physical therapists and speech language pathologists shall complete a master's degree.
    - Occupational therapists must complete a master's degree
- Case Managers and Social Workers
  - Social Workers and Case Managers shall meet requirements for state licensure
    - At least one year experience in the treatment of stroke survivors
    - Social Workers shall complete a master's degree
    - Nurse Case Managers shall complete at least a bachelor's degree
    - Nurse Case Managers and Social Workers shall have adequate knowledge of inpatient rehabilitation facilities and community resources in their geographic region
- Multidisciplinary team of health care professionals with expertise or experience in stroke representing:
  - Clinical or Neuropsychology
  - Nutrition services
  - Pharmacy (including a Pharmacy Doctorate [Pharm D] with stroke expertise)
- Research
  - Shall have the professional and administrative infrastructure necessary to conduct clinical trials
  - Actively participate in ongoing clinical research
  - Actively carry out investigator initiated clinical research projects
- Education
  - Professional programs – CSC staff prepare and present at least two educational courses per year aimed at health care professionals within or outside of the CSC, and for Level II and Level IV designated Stroke Centers
  - Public education – CSC sponsor at least two public educational activities each year that focus on some aspect of stroke
    - Lectures
    - Screenings
    - Health fairs
- Stroke registry or another similar data collection tool
  - LOS
  - Treatments received
  - Discharge destination and status
  - Incidence of complications
    - Aspiration pneumonia
    - UTI
    - DVT
  - Discharge medications

- Participate in a national and/or state registry (or registries)
  - Acute stroke therapy outcomes
    - IV tPA
    - Endovascular / interventional stroke therapy
- Multidisciplinary institutional quality assurance committee shall meet on a monthly basis to monitor quality benchmarks and review complications.
  - Quality improvement
  - Correction of errors
  - Systems improvement
  - Overall care of patients
  - Documentation exists to reflect:
    - Performance measures and indicators tracked
    - Specific interventions to improve in the selected measure
    - Specific outcomes to determine success
    - Implementation period and re-evaluation
- Serve as a resource for Level II, III, and IV designated Stroke Centers.
- Diagnostic Imaging Equipment:
  - MRI
    - Available 24/7
    - If medically indicated, MRI completed within two hours of the test being ordered
      - Basic MRI
      - Diffusion-weighted (DWI) MRI
      - Magnetic resonance (MR) perfusion – optional
      - MR angiography (MRA)
      - MR venography (MRV)
  - Catheter Angiography
    - Cerebral Angiography must be available 24/7
      - Digital Subtraction Angiography (DSA)
  - CT Angiography
    - CT Angiography (CTA)
    - CT perfusion - optional
  - Extracranial Ultrasonography
    - Carotid US
      - Demonstrates acceptable proficiency using guidelines established by the Intersocietal Committee for the Accreditation of Vascular Laboratories (ICAVL) or a similar credentialing organization
  - Transcranial Doppler
    - The TCD laboratory should track their results and seek certification from ICAVL or a similar organization
  - Transthoracic and Transesophageal Echocardiography
  - Tests of Cerebral Blood Flow and Metabolism
- Laboratory Services
  - Available 24/7 for initial stroke labs

- CBC with platelet count
  - Coagulation studies (PT/INT)
  - Blood chemistries
- Documentation indicates the ability to complete and report lab tests in less than 45 minutes from being ordered.
- Documentation indicates the ability to perform an EKG and chest x-ray within the same time frame as laboratory testing.
- Comprehensive hematological and hypercoagulability profile testing
- Endovascular Therapy
  - Given that intra-arterial thrombolysis and mechanical clot disruption are not yet FDA approved therapies we may want to consider not including that as a requirement for a Level I stroke center. However, if the center is doing these therapies, we should leave in the requirement to be involved in a registry. When these are approved as therapies we can go back and add them in. Comments?
  - Neuroendovascular specialist (eg, endovascular surgical neuroradiologist, neurosurgeon, neurologist, or cardiologist)
    - Capability to perform neuroendovascular coiling or embolizations
    - IA thrombolysis
    - Mechanical thrombolysis
    - Carotid Angioplasty and stenting
    - Intracranial circulation angioplasty and stenting
  - Registry shall be established to track treatments, outcomes, and complications.  
For all the endovascular and surgical procedures performed, the number, indications, and outcomes should be recorded and available for review.
- Relationships with Other Stroke Levels
  - Have a documented relationship with Level II, III and Level IV hospitals, to provide professional education as well as to receive transferred stroke patients as needed.

## Level II Primary Stroke Centers

- Requirements:
  - Meets the requirements specified by the Brain Attack Coalition's recommendations for a Primary Stroke Center
  - Meets the requirements specified for a Primary Stroke Center as specified by The Joint Commission
  - Follows the Brain Attack Coalition's benchmark treatment times:
    - Door to physician exam = 10 minutes
    - Door to Stroke Activation = 15 minutes
    - Door to CT Scan = 25 minutes
    - Door to CT Report = 45 minutes
    - Door to tPA = 60 minutes
  - Ability and willingness to have drip and ship protocol for complex cases
  - Hospital and Administrative support

- Acute Stroke Teams
  - Physician with experience in diagnosing and treating cerebrovascular disease
  - Hospital based stroke teams shall be available within 15 minutes by phone and at the bedside within the time period as designated by the stroke center director 24/7.
  - Response time may also be accomplished through telemedicine.
  - Evidence of stroke team log
    - Response times
    - Patient diagnosis
    - Treatments and actions
    - Outcomes
- Written Care Protocols
  - Written protocols/care paths for the acute workup and treatment are available in the
    - ED department
    - Acute care areas
    - Stroke units
  - Protocols include management of:
    - Ischemic stroke
    - Hemorrhagic stroke
    - Initial diagnostic tests
    - Blood pressure management
    - Glucose control
    - DVT prophylaxis
    - Use of medications
    - tPA treatment
    - Early mobilization and physical medicine and rehabilitation evaluation
- IV Thrombolytic therapy
  - The organization's formulary or medication list shall include a thrombolytic therapy (IV administered) medication for ischemic stroke
  - Documentation indicates the reason eligible ischemic stroke patients did not receive an IV thrombolytic therapy
  - Emergency department licensed independent practitioners have 24 hour access to a timely, informed consultation about the use of IV thrombolytic therapy, obtained from a physician, privileged in the diagnosis and treatment of ischemic stroke.
  - Use of the protocol, including IV thrombolytic therapy when indicated by the treating licensed independent practitioner, is reflected in the order sets or pathways, and is documented in the patient's medical record according to organizational procedure.
  - There is evidence that specific stroke performance measurement data, focused on use of IV thrombolytic therapy, as evaluated through the quality improvement process and by the stroke team
- Emergency Medical Systems
  - Treatment guidelines for pre-hospital personnel
  - EMS protocols shall include
    - Rapid, efficient patient assessment and triage
    - Prehospital EMS communication with hospital staff
    - Medical stabilization en route
    - Rapid communication between EMS and ED personnel during the transportation of acute stroke patients
- Emergency Department

- ED care providers are familiar with
  - Pathology, presentation, assessment, diagnostics, and treatment of patients with acute stroke
  - The location and application of stroke-related protocols, activation of the acute stroke team, and communications with inbound EMS
  - The recognition, assessment and management of acute stroke complications.
- ~~80 percent of the ED care providers must provide evidence of review of the acute stroke protocol~~
- Eighty percent of ED practitioners are knowledgeable of the pathophysiology, presentation, assessment, diagnostics, and treatment of patients with acute stroke including:
  - Initial treatment plan: treatment of the patient during the first three hours of care, including thrombolytic therapy for patients who present within three hours of initial onset of symptoms.
  - indications for use of IV thrombolytic therapy
  - contraindications to IV thrombolytic therapy
  - education to be provided to patients and families regarding the risks and benefits of IV thrombolytic therapy
  - signs and symptoms of neurological deterioration post IV thrombolytic therapy
- 
- Stroke Units
  - Care providers demonstrate evidence of initial and ongoing training in the care of the acute stroke patient
  - Stroke protocols / care paths are followed
  - Receive eight hours CEU's (or equivalent educational activity) yearly
  - Monitoring systems
    - Heart rate / rhythm with automatic arrhythmia detection
    - Blood pressure with noninvasive BP monitoring
    - Oximetry
- Neurosurgical Services
  - Neurosurgical services are available within two hours of when it is deemed clinically necessary or has protocol for transfer to appropriate facility
  - Facilities that do not transfer patients for neurosurgical emergencies has a fully functional OR facility and staff available within two hours of when it is deemed clinically necessary
- Neuroimaging
  - Available 24/7
  - CT scans obtained within 25 minutes of being ordered
  - CT image evaluated by qualified personnel within 20 minutes of completion
  - Review of the images does not have to be done on site. Evaluation can be performed off site by telemedicine technology.
  - Documentation indicates that on a 24/7 basis, 80 percent of acute stroke patients have a diagnostic brain image completed within 45 minutes of it being ordered
- Laboratory Services
  - Available 24/7 for initial stroke labs
    - CBC with platelet count
    - Coagulation studies (PT/INT)
    - Blood chemistries
  - Documentation indicates the ability to complete and report lab tests in less than 45 minutes from being ordered
  - Documentation indicates the ability to perform an EKG and chest x-ray within the same time frame as laboratory testing
  - Comprehensive hematological and hypercoagulability profile testing



- Outcomes / Quality Improvement
  - Evidence of specific stroke performance measurement and review by quality improvement department and stroke team.
  - Documentation exists to reflect:
    - Performance measures and indicators tracked
    - Specific interventions to improve in the selected measure
    - Specific outcomes to determine success
    - Implementation period and re-evaluation
- Educational Programs
  - Minimum of one stroke public education activity per year
- Relationships with Other Stroke Level Hospitals
  - Have a documented relationship with Level III and Level IV hospitals, to provide professional education as well as to receive transferred stroke patients as needed.

### **Level III Support Stroke Centers**

- Requirements:
  - Follows the Brain Attack Coalition's benchmark treatment times:
    - Door to physician exam = 10 minutes
    - Door to Stroke Activation = 15 minutes
    - Door to CT Scan = 25 minutes
    - Door to CT Report = 45 minutes
    - Door to tPA = 60 minutes
  - Ability and willingness to start drip and ship protocol
  - Hospital support for state policies to bypass hospital for a higher level when prehospital triage indicates the need for higher level of care
  - Hospital support and participation as spoke hospital in a regional Hub and Spoke system) with at least one regional Hub hospital
  - Established telestroke system with at least one regional Hub hospital  
Hospital and Administrative support
  - Transfer agreement in place with either Level I or Level II centers
- Acute Stroke Teams

Acute stroke team members defined by the institution

Physician with experience in diagnosing and treating cerebrovascular disease

  - Available within five minutes by phone and at the bedside within 20 minutes, 24/7.
  - Response time may also be accomplished through telemedicine.- Evidence of stroke team data collection
  - Response times
  - Patient diagnosis
  - Treatments and actions
  - Outcomes

- Written Care Protocols
  - Written protocols/care paths for the acute workup are available in the ED
    - Ischemic and Hemorrhagic stroke care
- tPA treatment Emergency Medical Systems
  - Treatment guidelines for pre-hospital personnel
  - EMS/first responder protocols shall include
    - Rapid, efficient patient assessment and triage
    - Prehospital EMS communication with hospital staff
    - Medical stabilization en route
    - Rapid communication between EMS and ED personnel during the transportation of acute stroke patients to a higher level of care
- Emergency Department
  - ED care providers are familiar with
    - Pathology, presentation, assessment, stroke scales, diagnostics, and treatment of patients with acute stroke
    - The location and application of stroke-related protocols, activation of the acute stroke team, and communications with inbound EMS
    - The recognition, assessment and management of acute stroke complications.
  - 80 percent of the ED care providers can provide evidence of review of the acute stroke protocol
- Neurosurgical Services
  - Neurosurgical services are available within 2 hours of when it is deemed clinically necessary or has protocol for transfer to appropriate facility
- Neuroimaging
  - Review of the images does not have to be done on site. Evaluation can be performed off site by telemedicine technology.
  - Documentation indicates that on a 24/7 basis, 80 percent of acute stroke patients have a diagnostic brain image completed and reviewed within 45 minutes of arrival.
- Laboratory Services
  - Available 24/7 for initial stroke labs
    - CBC with platelet count
    - Coagulation studies (PT/INR)
    - Blood chemistries (CONSIDER CKMB AND TROPONIN)
  - Documentation indicates the ability to complete and report lab tests in less than 45 minutes from arrival.
  - Documentation indicates the ability to perform an EKG and chest x-ray within the same time frame as laboratory testing.
- Outcomes / Quality Improvement
  - Evidence of ongoing specific stroke performance measurement and review by quality improvement department and stroke team.
  - Documentation exists to reflect:
    - Performance measures and indicators tracked
    - Specific interventions to improve in the selected measure

- Specific outcomes to determine success
  - Implementation period and re-evaluation
- |
- Educational Programs
    - Minimum of one stroke public education activity per year
    - Stroke team members:
      - NIHSS certification maintained
      - tPA competency annually
      - TCD education
  - Documented Relationships with either a Level I or Level II Stroke Center
    - Have a documented relationship with Level I and Level II hospitals, to receive professional education as well as to transfer stroke patients to those facilities as needed.

## **Level IV Hospitals**

- Requirements:
  - These hospitals have an established relationship with a Level I, II or III hospital for management and transport of the acute stroke patient.
  - ED staff trained in recognition of stroke signs and symptoms.
  - Protocols in place for rapid identification and transport.

## Resources

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7. Mechanical Thrombectomy for Acute Ischemic Stroke. Final Results of the Multi MERCI Trial. Smith WS, Sung G, Saver J, Budzik R, Duckwiler G, Liebeskind DS, Lutsep HL, Rymer MM, Higashida RT, Starkman S, Gobin YP; Multi MERCI Investigators. *Stroke*. 2008 Feb 28
8. Organizing regional networks to increase acute stroke intervention. Rymer MM, Thrutchley DE; For the Stroke Team at the Mid America Brain and Stroke Institute. *Neurol Res*. 2005;27 Suppl 1:S9-16
9. Revascularization Results in the Interventional Management of Stroke II Trial. Tomsick T, Broderick J, Carrozella J, Khatri P, Hill M, Palesch Y, Khoury J; for the Interventional Management of Stroke II Investigators. *AJNR Am J Neuroradiol*. 2008 Mar;29(3):582-587.
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13. Largest-ever Stroke Registry Confirms Safety Of Actilyse Thrombolysis Treatment For Acute Ischaemic Stroke. Wahlgren N et al. Thrombolysis with alteplase for acute ischaemic stroke in the Safe Implementation of Thrombolysis in Stroke-Monitoring Study (SITS-MOST): an observational study. Lancet 2007;369:275-82. Results from SITS-MOST (Safe Implementation of Thrombolysis in Stroke - MOonitoring STudy) published in The Lancet today confirm that routine clinical thrombolysis therapy with Actilyse® (alteplase), the first and only approved treatment for acute ischaemic stroke, is as safe and effective as previously reported in randomised controlled trials when administered within three hours of onset of a stroke.<sup>1,2,3</sup> This result is borne out across a wide range of centres, from those with specialist units to those with little previous experience.
14. Review State legislative stroke center designation
  - Texas

CEA Background for discussion:

- In its first quality improvement initiative, the Leapfrog Group named CEA as one of the surgical procedures that should be performed in hospitals meeting minimum annual procedure volumes, suggesting that a hospital should perform at least 100 procedures/year in order to obtain the best outcomes. Birkmeyer JD, Finlayson EV, Birkmeyer CM. Volume standards for high-risk surgical procedures: potential benefits of the Leapfrog initiative. *Surgery*. 2001;130:415–422. [PubMed].
- Annual surgical volume for carotid endarterectomy (CEA) procedures

The number of surgeries a hospital or surgeon performs is easily measured and has been used to denote clinical expertise. Procedure volume (number of cases per surgeon) has therefore become a widely-used quality indicator for surgery.

- According to the Agency for Healthcare Research and Quality (AHRQ), a higher volume of carotid endarterectomy cases is associated with lower mortality and complication rates. Lower-volume facilities with well-trained surgeons may also achieve excellent clinical outcomes; however, the odds favor patients who are treated in hospitals with a higher number of procedures.
- Some hospitals care for patients with a greater severity of illness and their outcomes may reflect the increased surgical risk of those patients, e.g., sicker patients may increase the likelihood of poor outcomes.
- Individual surgeon volume for carotid endarterectomy (CEA)
- It has been suggested that the volume of procedures performed by an individual surgeon, rather than the hospital as a whole, has more bearing on the outcomes of carotid endarterectomy (CEA) procedures. (*Journal of the American College of Surgeons*, December 2002: 195(6); 814-821)
- While there has been no guideline set for the number of carotid endarterectomies (CEA) a surgeon should perform to maintain quality, studies suggest that 10-50 procedures/year should be performed to maintain competence. (*American Journal of Surgery*, May 2001: 181(5); 450-453)
- The Leapfrog Volume Criteria May Fall Short in Identifying High-Quality Surgical Centers.
- Original Papers and Discussions
- *Annals of Surgery*. 238(4):447-457, October 2003.  
*Christian, Caprice K. MD, MPH \*; Gustafson, Michael L. MD, MBA \*; Betensky, Rebecca A. PhD +; Daley, Jennifer MD ++; Zinner, Michael J. MD \**
- Abstract:  
Objective: The original Leapfrog Initiative recommends selective referral based on procedural volume thresholds (500 coronary artery bypass graft [CABG] surgeries, 30 abdominal aortic aneurysm [AAA] repairs, 100 carotid endarterectomies [CEA], and seven esophagectomies annually). We tested the volume-mortality relationship for these procedures in the University HealthSystem Consortium (UHC) Clinical Database<sup>SM</sup>, a database of all payor discharge abstracts from UHC academic medical center members and affiliates. We determined whether the Leapfrog thresholds represent the optimal cutoffs to discriminate between high- and low-mortality hospitals.
- Methods: Logistic regression was used to test whether volume was a significant predictor of mortality. Volume was analyzed in three different ways: as a continuous variable, a dichotomous variable (above and below the Leapfrog threshold), and a categorical variable. We examined all possible thresholds for volume and observed the optimal thresholds at which the odds ratio is the highest, representing the greatest difference in odds of death between the two groups of hospitals.
- Results: In multivariate analysis, a relationship between volume and mortality exists for AAA in all three models. For CABG, there is a strong relationship when volume is tested as a dichotomous or categorical variable. For CEA and esophagectomy, we were unable to identify a consistent relationship between

volume and outcome. We identified empirical thresholds of 250 CABG, 15 AAA, and 22 esophagectomies, but were unable to find a meaningful threshold for CEA.

- Conclusions: In this group of academic medical centers and their affiliated hospitals, we demonstrated a significant relationship between volume and mortality for CABG and AAA but not for CEA and esophagectomy, based on the Leapfrog thresholds. We described a new methodology to identify optimal data-based volume thresholds that may serve as a more rational basis for selective referral.

## Attachment 3 Emergency Medical Dispatch Protocol

Discussed December 2, 2008

### PURPOSE

To outline the dispatch protocol for all time critical diagnosis patients.

PROTOCOL (draft used for discussion)	Changes at meeting
1. All agencies who accept calls for EMS assistance from the public and/or dispatch emergency medical personnel shall be certified and have an Emergency Medical Dispatch Priority Reference System (EMDPRS) used by certified Emergency Medical Dispatchers.	1. All agencies who dispatch emergency medical personnel shall be certified and have an Emergency Medical Dispatch Reference System (EMDPRS) used by certified Emergency Medical Dispatchers.
2. All EMDPRS protocols used by emergency medical dispatch agencies must be approved by the EMS Service Medical Director to assure compliance with national standards. Any EMDPRS approved by the EMS Service, including its questions, instructions, codes, and protocols, shall be used as a whole rather than piecemeal.	2. All EMDPRS protocols used by emergency medical dispatch agencies must be approved by the EMS Service Medical Director to assure compliance with national standards. Any EMDPRS approved by the EMD medical director including its questions, instructions, codes, and protocols, shall be used as a whole rather than piecemeal.(need to include both)
3. Use of a Department-approved EMDPRS on every request for medical assistance.	
4. Each EMD shall follow the questions and decision-making processes within their EMDPRS in compliance to the written policies and procedures of their EMD agency as approved by the EMS Service.	
5. Each EMD shall provide dispatch life support (including pre-arrival instructions) in compliance to the written text or scripts and other processes within the approved EMDPRS.	
6. Each EMD agency shall have in place EMS Service approved policies and procedures for the safe and effective use of their approved EMDPRS.	
7. Need to add QI	



## Attachment 4-Emergency Medical Services (EMS) Stroke Protocol

### Out-of-Hospital Work Group Discussed December 2, 2008

<b>DISTRIBUTION</b> All Pre-hospital Operations Personnel.	
<b>PURPOSE</b> To outline the treatment guidelines regarding patients experiencing a suspected stroke.	
<b>PROTOCOL (draft protocol used for discussion)</b>	<b>Changes made at Dec. 2 meeting</b>
<b>ON SCENE</b>	
1. ABC's (follow Airway/Oxygenation Protocol). Maintain oxygen saturation at a minimum of 93%. If oxygen saturation falls below 93%, administer low flow oxygen at 2-4 LPM.	1. ABC's (follow Airway/Oxygenation Protocol). Maintain oxygen saturation at a minimum of 93%. If oxygen saturation falls below 93%, administer low flow oxygen at 2-4 LPM. (more specific)  Do not routinely administer high flow oxygen to stroke patients. <b>IF</b> the patient has shortness of breath, oxygen saturation below 92%; or decreased level of consciousness, increase oxygen as needed.
2. Obtain blood glucose level. Treat only if less than 50 mg/dl.	2. Obtain blood glucose level. Treat only if less than 50 mg/dl.
Obtain vital signs and a brief history. (NOTE: Make sure to include last time without symptoms and any additional witness information).	2. Obtain vital signs and a brief history (last time seen normal or without symptoms).
3. Perform a basic stroke exam using the Cincinnati Prehospital Stroke Scale (?).	3. Perform a basic stroke exam using the Cincinnati Prehospital Stroke Scale.  need state standard - single, universal don't specify which one easy to remember  stroke group: LA includes age, more info don't lock into Cincinnati
4. Do not delay transport. If the patient does not have an immediate life threat, transport urgently to a stroke center if available (within 10 minutes when possible).	4. Do not delay transport. Transport urgently to a stroke center (on scene time of 10 minutes or less). Determine the most appropriate means of transport, for example air.

PROTOCOL (draft protocol used for discussion)	Changes made at Dec. 2 meeting
<p>NOTE: A stroke center as defined by TCD regulation. Level ? if &lt; ? minutes Level ? if &gt; ? minutes but &lt; ? minutes</p>	<p>stroke: need to regionalize</p> <p>less than two hours of symptom onset - any facility with tPA (nearest level I, II, or III) hospital has 1 hour to treat treatment needs to start within three hours if longer, need to identify regionally</p> <p>if system onset cannot be determined, take to highest level available</p> <p>if not tPA eligible, need to go to primary care for neurologist to evaluate</p> <p>suggestions- make this regional</p> <p>goal is three hours - regional decision how to meet three hour goal - timeline needs to be revised as new evidence comes in</p>
<b>EN ROUTE</b>	
1. Contact Medical Control and notify of possible stroke patient as soon as possible.	1. Contact receiving facility and notify of suspected stroke patient as soon as possible.
2. Obtain vital signs and EKG.	
3. Establish an IV (follow IV Protocol).	3. Establish an IV (follow local IV Protocol). IV should be large bore at least 18 gauge
4. Perform an expanded stroke exam if time and patient condition will allow.	4. Additional exam en route (beyond Cincinnati) other screening tools
5. Do not treat hypertension without specific approval from Medical Control.	
6. Patient should be transported with head elevated less than 30 degrees, unless risk of aspiration is present.	6. Patient should be transported with head flat unless risk of aspiration is present. -Need reference from stroke group
7. Patient handoff at the hospital should include: patient assessment and condition upon arrival, including time of onset; care provided; and changes in condition following treatment.	<p>Stroke group – family contact - cell number where family can be contacted immediately</p> <p>medications need from stroke group: inter-hospital transfer protocol</p>